

UK renewable energy auctions

A deep-dive into the rising cost of seabed leases



How will high prices in the recent UK auction for seabed leases impact consumer bills and future wind energy investment?

In recent years, the UK has become a world-leader in offshore wind development, underpinned by its approach to facilitating private sector investment in the sector. The process involves managing access to seabed, followed by a “contract-for-difference” (CfD) auction that reduces price risk for projects.

This mechanism has delivered significant quantities of offshore wind, which stands to be a major contributor to the UK’s net-zero ambitions, at a competitive price for consumers.

However, the price of seabed leases has recently surged and, as a result, concerns have been expressed that further price reductions in the CfD auction and continued offshore wind investments may be in jeopardy.

The causes and potential consequences of this change provide important lessons for the industry in the UK and internationally.



UK Offshore wind market context

The UK government has ambitious offshore wind energy targets, aiming to secure 40GW by 2030. So far, about 10GW of offshore wind is operational, with c.15GW at advanced stages of development and an additional 8GW expected from the most recent round of bidding in the seabed leases auction. The government will hold regular auctions until the end of the decade in order to meet its targets.

Until recently, access to the seabed was managed through a submission process and renewables support was allocated rather than tendered. But in line with many governments around the world, the UK has shifted to auctions for both of these processes.

The UK approach now involves two separate auctions. The first is the 'Offshore Wind Leasing Round' managed by the Crown Estate (TCE), which grants access to the seabed for a fee; the second is the CfD auction, managed by Government, which guarantees a certain level of price for electricity generated by offshore wind projects and therefore facilitates project financing. In this second auction, allocation of Government support through a competitive tender is a way to ensure sufficient competition to deliver the energy transition in an affordable manner for consumers. Support is awarded as part of a 'contract-for-difference' – the difference paid to developers by Government being between the strike price and the wholesale electricity price.

To date, the process has been successful in delivering significant wind capacity at a rapidly decreasing cost for consumers. In 2015, the average CfD strike price was around £118 per MWh, procuring 1.2GWs of offshore wind. By 2019, the average price had plummeted to just £41 per MWh, for 5.5 GWs of offshore wind capacity. However, when the winners of the most recent seabed auction (Offshore Leasing Round 4) come to bid for CfDs (which will likely be in CfD Auction Rounds 5 and 6), the industry fears that this price

reduction trend may halt or even reverse. That's because the latest bidding round for seabed leases was associated with high clearing prices compared to the costs faced by other projects in the past.

While the Offshore Leasing Round 4 has been hailed as a 'vote of confidence' in the UK's green energy sector, it also presents developers with a material cost burden before they commence any construction activity. And since the CfD is funded through a levy on British electricity suppliers, any 'pass-on' that they may achieve at that stage of the process risks being funded by the UK consumer¹.

There are several reasons why the price of seabed leases has risen.

Enter the oil majors

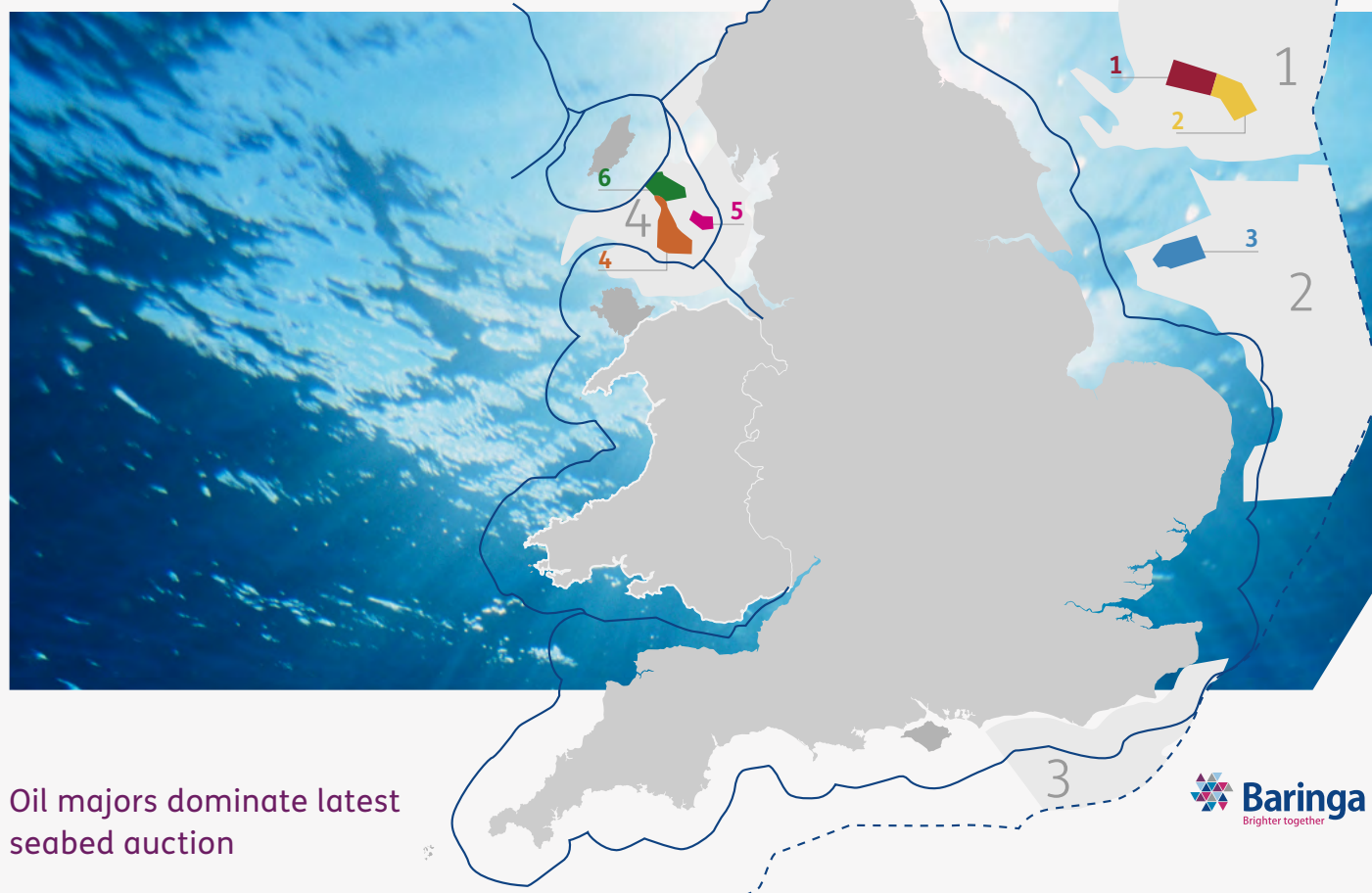
As a capital-intensive activity, offshore wind is dominated by large players and consortia. Existing developers in the UK wind sector include large vertically integrated utilities such as ScottishPower Renewables and RWE, and large developers, including Vattenfall, Orsted and GIG, as well as some state-owned entities, such as Norway's Equinor.

However, the latest Offshore Leasing Round 4 saw the entry of major oil and gas multinationals, players that were not previously active in UK offshore wind energy. These companies are under pressure to diversify their exposure to oil and gas, and face different strategic pressures compared to incumbents.

During the latest round, access to the seabed was allocated at a cost ranging from £44.8m per year for 480MW to £114-£231m for 1,500MW, which will amount to several hundreds of millions by the time developers proceed to construction. The participation of the oil majors, associated with their different strategic interest in securing a site, may have played a significant role in inflating seabed lease prices. In fact, the only incumbent player to win a project was RWE Renewables.

1) Subject to the application of the Control for Low Carbon Levies

Offshore Wind Leasing Round 4



Oil majors dominate latest seabed auction

SUCCESSFUL BIDDER	PROPOSED PROJECT CAPACITY (MW)	OPTION FEE DEPOSIT (£M)	FEE PER MW (£)
Consortium of EnBW and BP	1500	231	154,000
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Cobra Instalaciones y Servicios, S.A. and Flotation Energy plc	480	44.8	93,233
RWE Renewables	1500	133.4	88,900
Total	1500	124.6	83,049
RWE Renewables	1500	114.3	76,203

TCE auction mechanics

But the rise in seabed lease prices is not merely a market phenomenon. Prior to the start of the process, Baringa modelled the auction and our simulations resulted in high pricing. This outcome is, in part, a function of the design of the auction for seabed leases:

- **First-price:** in some instances, auction winners pay the second highest price, but in this case, the highest bidder pays the price they actually bid. While the theory of ‘revenue equivalence’ suggests that the expected income will be the same under both designs (since this will be factored into the bids), in an imperfect market with high uncertainty (see below), this theory breaks down, leaving a higher probability of outlier bids paying full price and a significant risk of ‘Winner’s curse’ for developers.
- **Anchoring:** the auction used sealed bids, and only the winning bids were revealed as sites were allocated every day. This had the effect of anchoring the price of subsequent rounds around the prices winning in the previous days, with developers bidding in later rounds then encouraged to increase their bids in order to be successful.
- **Capacity constraint:** despite an aggressive MW target to 2030, the capacity released in this round was rather small (see the size of actual projects compared to the shaded potential bidding areas on the map opposite). With a high number of participants, and levels of demand for seabed well in excess of supply, limited capacity being awarded resulted in intense price competition.

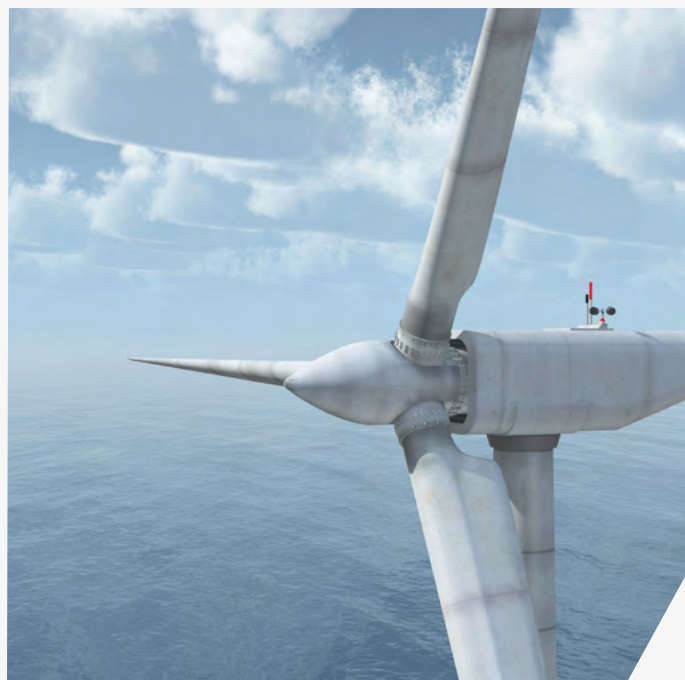
Finally, the uncertainty associated with the process is not just a result of the typical delivery risks faced by large, capital-intensive projects, but also because the fees for access to seabed (see table opposite 3rd column) are payable on an annual basis, until construction begins. By targeting ambitious development lead times, developers can apply a smaller annual multiplier to their costs, thus allowing them to bid more into the auction while hitting their return targets. But recent examples of project consents being quashed by the High Court as a result of disputes with local communities indicate that material delay risks still exist in the process.

Theory of pass-on

Given that the seabed auction is part of a wider process for procuring renewables, it is not just the winners that may be cursed by high seabed costs. Specifically, *is it possible that consumers will pay for the increased cost of seabed leases via an increase in CfD strike price?*

Of relevance to this question is the theory of pass-on, which identifies three major determining factors:

- Commonality:** the theory predicts that price shocks that are common to all players in a market will typically be passed-on to the consumer, whereas shocks to individual suppliers are harder to pass on.
- Competition:** the degree of competition in the market is also important, with a perfectly competitive market passing on the entire cost-increase, and a perfect monopoly would pass on just half².
- Pivotality:** cost increases are more likely to be passed on when the affected parties are marginal in the supply stack (where marginal refers to the highest bid that must be accepted in order to meet the target demand.)



2) This counter-intuitive outcome is a function of competitive markets pricing at marginal cost and the more complex profit maximisation problem in case of a monopoly.

Risks of pass-on in the CfD auction

COMMONALITY	COMPETITION	PROJECT MERIT ORDER
Cost increases relate only to those projects that have cleared in this seabed auction. Since CfD auctions include both those and unaffected incumbents, and seabed costs also differ between recently cleared projects, commonality is likely to be limited.	The CfD auction is competitive, but not perfectly so and therefore developers are able to influence prices for offshore wind only to some extent.	However, there could be a bias towards TCE projects being price-setting due to higher seabed lease costs increasing project bids into the CfD auction, and the fact that the last clearing project sets the price for all. It is also possible that such projects would not clear CfD auctions if limited capacity is procured. This is illustrated in the merit order chart, which shows projects with high seabed costs towards the end of the merit order.

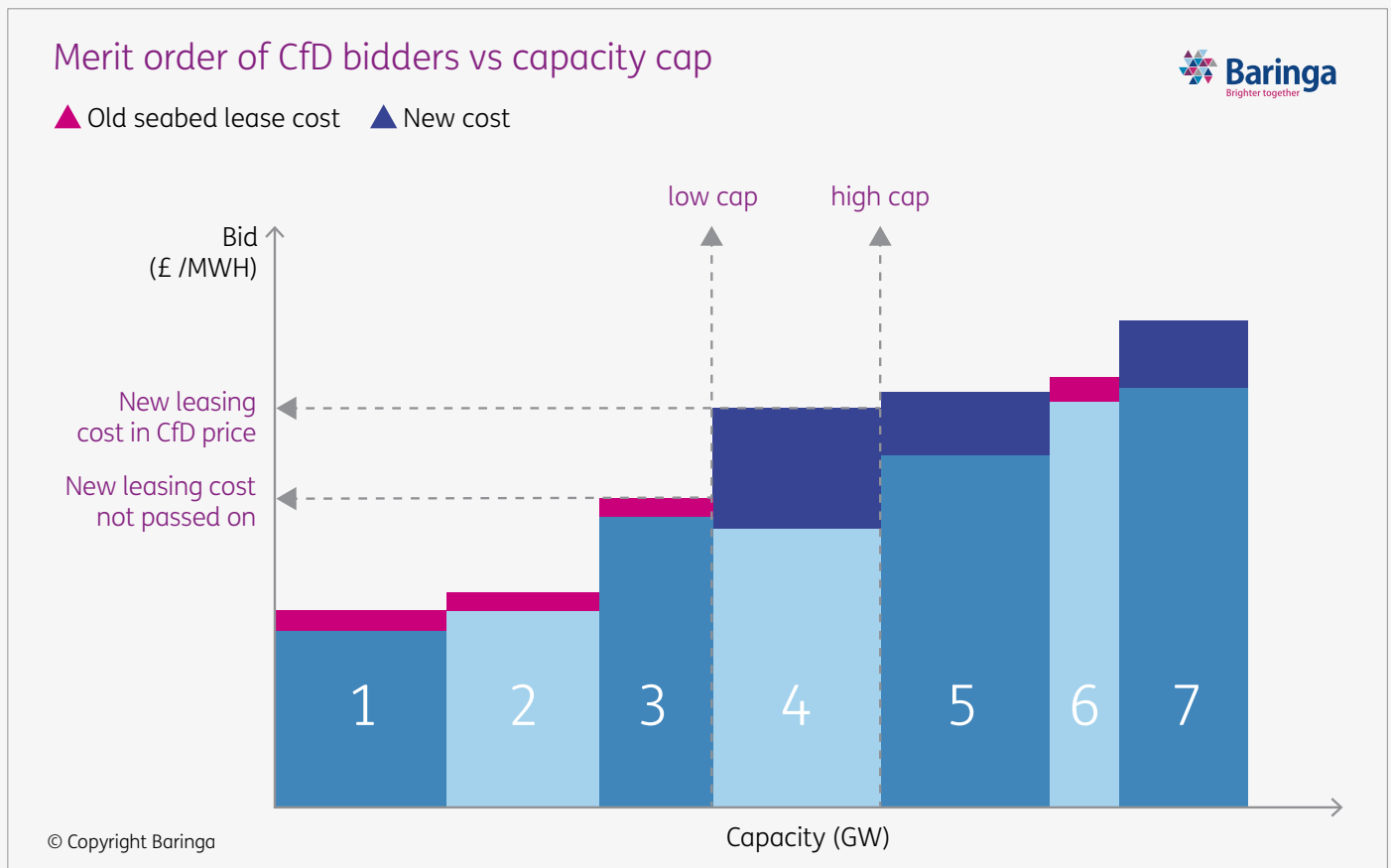
CfD auction mechanics

As the table above suggests, it is reasonable to conclude that the higher seabed-lease costs are likely to be recovered at the CfD stage in the future to some extent. In initial rounds still including projects with lower seabed costs, commonality will be limited and projects with high seabed leases may not be price-setting if they are out-competed by other projects that do not have those leases. This would imply that pass-on may not occur in the next CfD allocation round. However, in future rounds, the likelihood of pass-on is expected to increase if most projects bidding into the auction have incurred high seabed lease costs, implying a greater degree of commonality and making it more likely that such projects would be price-setting.

However, the relevant CfD auctions (AR 5-6) will be held in the mid-2020s; and all things need not be equal.

The UK government directly runs this part of the process, and it sets a capacity and a budget cap (together with other parameters) for each round, according to a trade-off between achieving renewable capacity objectives and protecting consumers from high prices. Given this discretion, if the government determines that projects are expensive, or if it wants to boost competition, a lower cap may be set, reducing the probability of pass-on. Conversely, if it decides that more capacity is needed, it may raise the cap and pass-on may occur if high-lease-price projects are price-setting.





Note: This graph is a simplified visualisation of CfD auction dynamics. In practice, many other costs can create bid differentiation beyond the cost of seabed leases (e.g. transmission charges, load factor).

But the capacity and budget caps are not the only tool at the government's disposal. It could, for example, choose to increase competition for offshore wind by making it compete against other established renewables technologies in the same technology 'Pot' (currently offshore wind is 'insulated' from other technologies, within its own renewables 'Pot 3').

Impact on investment

Finally, will the rising cost of seabed leases reduce future investment in the sector?

Following the publication of the outcomes of TCE's auction for seabeds, a number of market participants have expressed a concern that high seabed costs may result in a reduction in offshore wind investments, which could compromise the UK's offshore wind ambitions and net zero targets. The basis for this concern is that CfD prices may be insufficient to deliver targeted rates of return, which could reduce investment in the UK and lead developers to turn to more attractive markets in the longer run. Alternatively, higher costs for seabed access could mean that developers choose to invest in a smaller number of projects or less capacity, due to internal financial constraints.

A helpful reference case in assessing this risk are the auction processes for allocating the electromagnetic spectrum for mobile technology, such as 3G and 4G, where spectrum is a comparable asset to the seabed (in that spectrum access is essential for telecommunications companies to offer innovative 3G and 4G services, while seabed is required for energy companies to build offshore wind farms).

Spectrum auctions have been analysed in a significant body of academic literature, and a number of studies have analysed the link between the price of spectrum, consumer outcomes, and the levels of investment in the sector.

Analysis of network deployment in developed and developing countries undertaken by the mobile operators industry body (GSMA) shows that higher spectrum prices have indeed been associated with a slower roll-out of network coverage and lower network quality. In addition, constraining the amount of spectrum being made available in the auctions resulted in delays in the deployment of new network technologies.

The degree to which this analogy will hold with seabed auctions is uncertain, and a key determinant will be the level of pass-on at the CfD stage:

- If developers are able to pass on seabed leases costs, then the impact on investment will be limited as developers will be able to obtain targeted rates of returns through higher consumer prices for offshore wind.
- However, if pass-on is limited, developers will face a reduction in their rate of returns on offshore wind investments in the short-term. In the medium-term, they may choose to exit the UK market in light of lower available returns, or adjust their bids in the seabed auction to a lower level, thereby reducing costs and enabling greater returns.

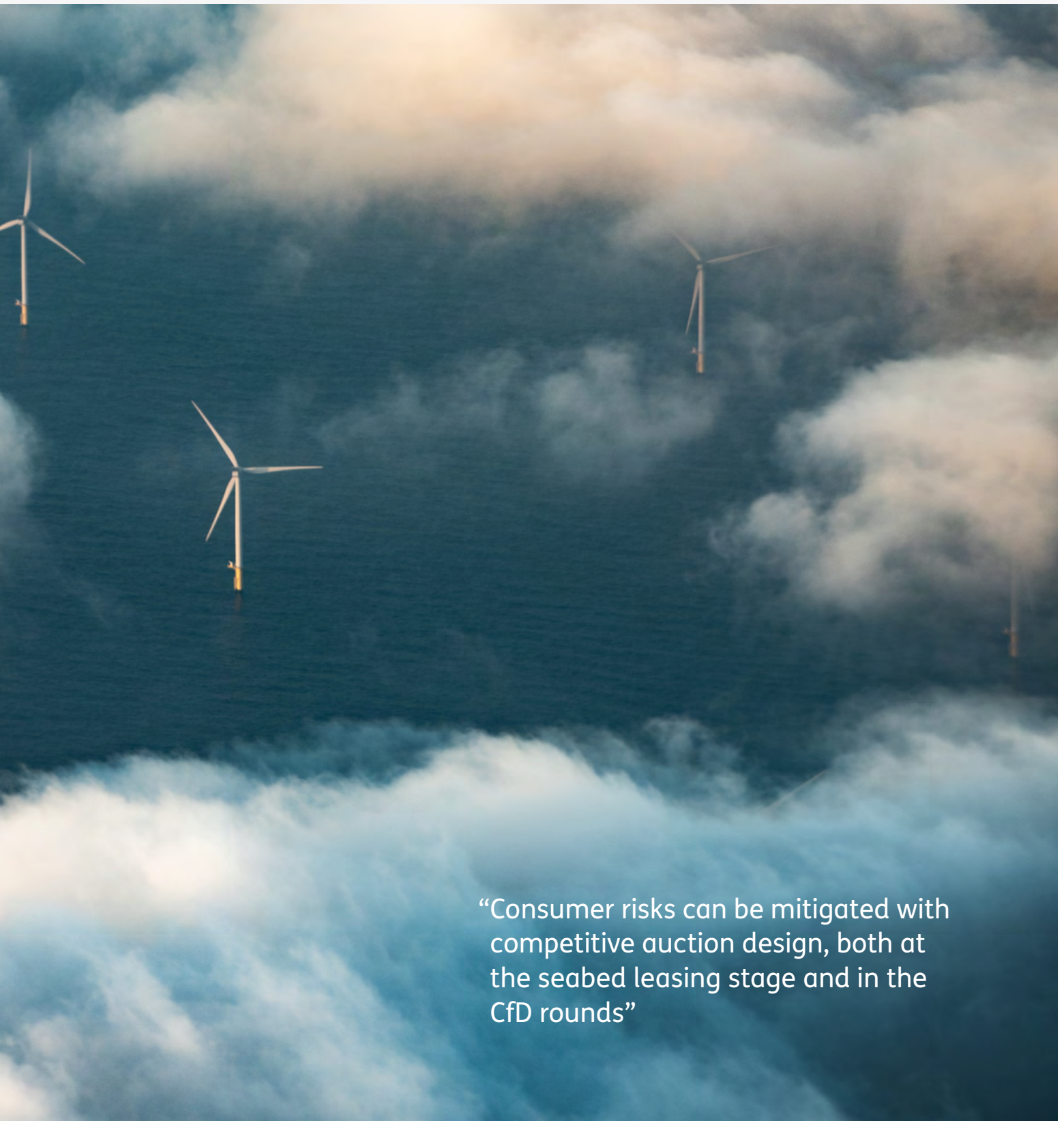
Conclusions

The latest round of seabed lease auctions has seen considerable increases in the price of seabed for offshore wind development. Going forward, there are a range of possible market outcomes, from consumers paying higher prices for offshore wind energy, to reduced investment in the sector, and sustained price reductions and investment levels.

Nonetheless, we believe that offshore wind will continue playing a significant role in the UK's decarbonisation ambitions. Consumer risks can be mitigated with competitive auction design, both at the seabed leasing stage and in the CfD rounds, and the managers of both auctions are likely to collaborate on future processes to define frameworks delivering positive outcomes.

In the context of uncertainty on the direction which the market will take in the coming years, offshore wind developers will need to consider the outcomes of this process in the definition of their bids in future CfD and seabed auctions, as they seek to guarantee the competitive positioning of their project and achieve attractive returns or expand their foothold in the market.





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Baringa Partners

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